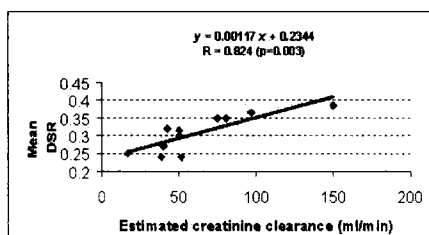


marized in the graph below. Regression analysis yielded a correlation coefficient $R=0.824$ ($p=0.003$).

CONCLUSIONS: These data demonstrate a strong correlation between mean diastolic/systolic Doppler velocity ratio by contrast-enhanced renal ultrasound and estimated creatinine clearance.



1057-90

Arterial Vasodilators Have More Beneficial Effects on Left Ventricular Afterload Than Apparent From Measurements of Cuff Blood Pressure

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Background: Early return of wave reflection from the lower body augments central systolic blood pressure and increases left ventricular (LV) afterload. Such changes are due to increases in arterial stiffening and pulse wave velocity (PWV). Trials such as the Heart Outcomes Prevention Evaluation (HOPE) study showed significant reductions in cardiovascular events with minimal reduction in cuff blood pressure (3/2 mm Hg) and concluded that the benefits are independent of the ACE inhibitor ramipril's effect on blood pressure. ACE inhibitors and other arterial vasodilators increase arterial compliance and reduce wave reflection from the lower body, and so decrease systolic blood pressure and LV afterload to a far greater extent than is apparent from measurements of pressure in the brachial artery. Accordingly, the aim of this study was to compare the differences in central aortic and brachial artery pressures before and after arterial vasodilation.

Methods: Systolic and diastolic ascending aortic blood pressure were measured directly with a catheter-manometer system and compared to simultaneous brachial artery blood pressure measured indirectly with a cuff sphygmomanometer before and after intravenous nitroglycerin (100-150 µg/m) in 17 patients (age 64±15 yrs) undergoing cardiac catheterization for chest pain.

Results: After nitroglycerin, ascending aortic systolic pressure fell in all cases (avg 26±14 mm Hg) whereas, cuff brachial artery systolic pressure remained unchanged in two and fell to a lesser amount in the others (avg 17±14 mm Hg; $p<0.01$). Diastolic aortic pressure also fell in all cases (avg 9.0±6.0 mm Hg) whereas, brachial diastolic pressure increased in four, remained unchanged in one and fell by a lesser amount in the others (avg 4.0±6.0 mm Hg; $p<0.05$). The large difference of 9.0 mm Hg between ascending aortic and brachial artery systolic pressure during vasodilation is attributable to the reduction in amplitude of the reflected pressure wave returning from the lower body as a result of a decrease in PWV.

Conclusions: The cuff sphygmomanometer cannot be relied upon exclusively for interpretation of hemodynamic benefit in trials such as HOPE.

1057-91

Coronary Vascular Characteristics of the Segment With Myocardial Bridge: Is It More Constrictive in Response to Acetylcholine?

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Background: Myocardial bridge (MB) is an anomaly in which the myocardium overlies the intramural course of segments of the epicardial coronary arteries. There have been cases of myocardial infarction and sudden cardiac death associated with MB. Coronary spasm is thought to be one of the factors accounting for the cardiac events associated with MB. However, it remains to be clarified whether the segments of the coronary arteries with MB have unusual characteristics. Therefore, we investigated whether the coronary vascular response to acetylcholine (ACh) at the segments with MB differed from those at the segments without MB. **Methods:** Acetylcholine (ACh, 3 µg/min, 30 µg/min and 100 µg/min) was infused into the left coronary ostium over 2 min in 10 patients with MB (Group I) and in 9 patients without MB (Group II), matched for age, gender, body mass index and coronary risk factors. Patients with myocardial infarction, and vasospastic angina were excluded from the study. The diameter of the proximal, mid, and distal segments of the left anterior descending coronary artery (LAD) were quantitatively measured. The change in diameter in response to each drug was expressed as the percent change from baseline values. The MB was defined as a >15% reduction of the diameter of the coronary artery in the systolic phase on quantitative coronary angiography after intracoronary injection of nitroglycerin. **Results:** All MB were located in the mid-segment of the LAD. The segment with MB was 13.9±1.0 mm long and 32±4 % in the systolic phase. The coronary diameter at all 3 segments at baseline did not differ between the 2 groups. The change in coronary diameter at the proximal and distal segments in response to ACh were similar in the 2 groups. However, the change in coronary diameter at the mid-segment in response to ACh significantly differed between the 2 groups (ACh 30 µg/min: -6.8±3.6% in Group I, 6.4±3.6% in Group II; ACh 100 µg/min: -18.4±5.5% in Group I, 2.2±2.0% in Group II, $p=0.0284$). **Conclusions:** These results suggest that the constrictive response to ACh was more enhanced in the segment with MB. The constrictive characteristics of the segment with MB may, in part, contribute to the cardiac events associated with MB.

1057-92

Fine Particulate Air Pollution and Ozone Inhalation Causes Acute Arterial Vasoconstriction in Healthy Adults

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Background: Fine particulate air pollution (PM_{2.5}) and ozone (O₃) are associated with increased cardiovascular mortality throughout the industrialized world. We have previously demonstrated increased plasma endothelin levels following PM_{2.5} exposure in humans, however its effect on vascular function has not been determined. To enhance the mechanistic understanding of this linkage, we investigated the effect of short-term air pollution exposure on vascular function.

Methods: Twenty-five healthy adults underwent a randomized, double-blind, cross-over study comparing vascular responses to the 2 hour controlled inhalation of 150 mg/m³ of concentrated ambient fine particles (CAP) plus O₃ (120 ppb) versus filtered air in a human exposure facility. Arterial endothelial-dependent and independent vasomotion were determined by flow-mediated dilatation (FMD) and nitroglycerin-mediated dilatation (NMD) of the brachial artery.

Results: Exposure to CAP + O₃ caused a significant brachial artery vasoconstriction compared to filtered air inhalation (-0.09 ± 0.18 mm vs. +0.01 ± 0.15 mm, $p=0.03$). Following CAP + O₃, 19 of the 25 subjects responded with brachial artery vasoconstriction versus dilatation, greater vasoconstriction, or blunted dilatation compared to filtered air responses. There were no significant differences in FMD, NMD, or blood pressure responses between exposures.

Conclusion: We have demonstrated for the first time that exposure to common urban air pollutants has an adverse effect on the vasculature of humans. Short-term inhalation of PM_{2.5} and O₃ at levels that occur in the urban environment caused acute conduit artery vasoconstriction. Conduit coronary artery vasoconstriction may promote cardiac ischemia/plaque instability after air pollution exposure in susceptible people. This study provides a plausible mechanism linking these ubiquitous air pollutants to cardiovascular morbidity and highlights the global public health importance of air quality.

POSTER SESSION

1058 Vascular Imaging, Function, and Clinical Outcomes

Sunday, March 17, 2002, 3:00 p.m.-5:00 p.m.

Georgia World Congress Center, Hall G

Presentation Hour: 3:00 p.m.-4:00 p.m.

1058-69

Effect of Contrast Enhancement on Measurement of Carotid Artery Intimal Medial Thickness

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Introduction: Previous studies have used standard B-mode ultrasound to quantify the aggregate mean intimal medial thickness (IMT) of the near and far wall of the common carotid artery (CCA). Many investigators have had difficulty in accurately evaluating the near wall IMT secondary to difficulty in discerning the vessel lumen and intima. **Purpose:** To determine the effect of contrast enhanced ultrasound on IMT measurement when compared to non-enhanced images.

Methods: 26 patients who had standard carotid ultrasounds completed over a 6 month period were evaluated. An ATL-HDI 5000 harmonic platform with 7-4 MHz linear transducer was used. 5-6 measurements of the near and far walls were obtained over a 1 cm distance, beginning and ending .5 cm and 1.5 cm, proximal to the carotid bifurcation. The measurements were made with and without the contrast agent, Optison, which was given as an IV bolus, 0.5-0.7 cc. Forty-five carotid arteries were examined and a total of 956 measurements were obtained. 10% of the carotid ultrasounds were re-studied approximately one month after the initial interpretation to assess observer accuracy. **Results:** The mean IMT of the near wall of the left and right CCA with contrast was .082 ± .022 versus .069 cm ± .022 cm without contrast ($p<0.0001$). For the far wall of the CCA, the mean IMT with contrast was .072 ± .022 versus .07 cm ± .016 without contrast ($p<0.3309$). Direct comparison was then made between the IMT of the near wall and far wall of the CCA. With contrast, there was a significantly thicker IMT of the near wall versus far wall ($p<0.001$). In evaluating the intra-reader reliability, the initial mean IMT of both the near and far walls without contrast was .058 cm ± .017 compared to the repeat mean of .057 ± .012. The initial IMT with contrast was .066 cm ± .022 and the repeat IMT mean was .064 ± .013. **Conclusion:** Contrast enhanced IMT measurement showed a statistically significant difference in near carotid wall thickness determinations versus non-contrast values. The thicker measurement is in agreement with previously reported data showing non-contrast images underestimated near wall common carotid IMT in histologic samples.